

Electronegativity and Polarity

Electronegativity is a number the relative ability of an atom, when bonded, to attract electrons. Electronegativity of the compound is calculated by subtracting lower electronegativity of the metal from higher electronegativity of the non metal. The value we get determines the polarity of the molecule.

If the value lies between:

0.0 - 0.7; the molecule is pure covalent bond therefore its not polar

0.7-1.7; the molecule is polar covalent bond therefore it is polar

1.7-4.0; the molecule is ionic

Dipole:



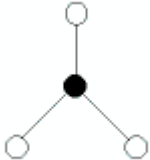
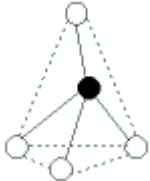
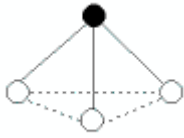

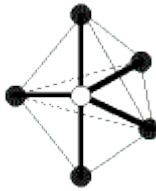
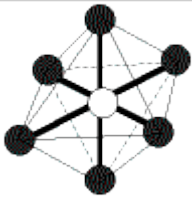
A polar bond leads to the formation of dipoles. One end of the molecule becomes slightly positively charged while the other end becomes slightly negatively charged and is represented by delta positive $+\delta$ and delta negative δ^- respectively.

Shapes of the Molecules

Molecule	Shape	Bond Angle	Example	3-D Shape
HX	Linear	-	H-Cl	
AX ₂	Linear	180 °	BeF ₂	
AX ₃	Trigonal	120 °	BF ₃	
AX ₄	Tetrahedral	109.5 °	CH ₄	
AX ₃ E	Pyramidal	107 °	NH ₃	
AX ₂ E ₂	V- Shaped	104.5 °	H ₂ O	
AX ₅	Trigonal Bipyramidal	120 and 90 °	PCl ₅	
AX ₆	Octahedral	90 °	SF ₆	

VSEPER Theory:

Lone pair-Lone pair repulsion > Lone pair-Bond pair repulsion > Bond pair-Bond pair

Total Number of electron pairs	Arrangement of electron pairs	Number of bonding pairs of electrons	Number of lone pairs of electrons	Shape of Molecule	Name of Shape	Bond Angle	Examples
not applicable	linear	1	not applicable		linear	180°	H ₂ , HCl
2	linear	2	0		linear	180°	CO ₂ , HCN
3	trigonal planar	3	0		trigonal planar	120°	BCl ₃ , AlCl ₃
4	tetrahedral	4	0		tetrahedral	109.5°	CH ₄ , SiF ₄
		3	1		trigonal pyramidal	$<109.5^\circ$ (bond angles in ammonia, NH ₃ , are 107°)	NH ₃ , PCl ₃
		2	2		bent	$<109.5^\circ$ (bond angles in water, H ₂ O, are 105°)	H ₂ O, SCl ₂
5	trigonal bipyramidal	5	0		trigonal bipyramidal	120° in the trigonal planar part of the molecule, 90° for the others	PCl ₅
6	octahedral	6	0		octahedral	90°	SF ₆

<http://www.usetute.com.au/shapemol.html>

"Shapes of Molecules." 2 Nov. 2008 <<http://www.usetute.com.au/shapemol.html>>.